



Charles Sturt
University

Risks Associated with the Clinical Treatment of Horses

Veterinary Clinical Centre
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Horses are complex animals and while it is not possible to cover in detail all the potential complications and risks associated with veterinary treatment, the following sections provide an outline of the major recognised areas of risk.

Before agreeing to veterinary treatment of your horse, it is important that you understand that all veterinary treatment and diagnostic procedures for animals involve some risk to the patient.

- Risk of Nosocomial Infection (Acquired in Hospital)
- Risks associated with Sedation and Anaesthesia
- General Risks associated with Surgery
- Risks associated with Specific Surgical Procedures
- Surgical Risks associated with Class of Horse
- General Risks associated with Antimicrobial Therapy
- Risks associated with Specific Antimicrobial Classes
- General Risks associated with Anti-inflammatory Drug Therapy
- Risks associated with Specific Anti-inflammatory Drug Classes
- Risks associated with Rectal Palpation / Per-Rectum Examination
- Risks associated with Twin or Multiple Pregnancies



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Risk of Nosocomial Infection (Acquired in Hospital)

Before agreeing to admission of your horse to hospital, it is important that you understand that hospitalisation of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to hospitalisation.

Horses are complex animals with individual and occasionally unpredictable responses to challenges such as infectious disease and veterinary treatments.

While it is not possible to cover in detail all potential complications and risks associated with hospitalisation, the following section outlines one of the major recognised areas of risk.

The risks of hospitalisation include acquiring infections that were not present prior to admission – Nosocomial Infections.

The risk of nosocomial infection in equine hospitals is comparable to the situation in human hospitals, where nosocomial infections occur in approximately 5% of all patients, with higher rates reported in intensive care patients.

A horse admitted for an elective surgical procedure can carry a virus or bacteria without showing clinical signs and can be a source of infection for other horses in the facility. Additionally, after the stress of the elective procedure, this same horse can develop clinical signs of that disease during postoperative care. Some disease conditions increase the infectious potential of the bacteria or virus that can also be contagious.

In addition, sick foals are usually accompanied by healthy mares; sick mares may be accompanied by healthy foals and occasionally, both the mare and foal are sick on admission or become sick during hospitalisation.

Several factors place hospitalised horses at risk of developing nosocomial infection. These include stress (associated with illness or changes in the environment), transport, fasting or changes in feed, invasive medical or surgical procedures, medication



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administration, and the presence of gastrointestinal disease, which can alter both normal motility and intestinal flora.

Veterinary hospitals are complex environments. They house sick animals with a range of conditions, from healthy animals which are in hospital for elective surgical treatment, to critically ill horses with severely compromised immune systems. Hospitals also experience high levels of human and equine traffic, making quarantine and disinfection challenging. It is not possible to make a stable or horse yard free from potentially infectious agents.

The consequences of a horse suffering from a nosocomial infection can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved.

At the Charles Sturt University Veterinary Clinical Centre, our staff are aware of the risks and consequences of nosocomial infection. We apply rigorous biosecurity protocols for cleaning tools, equipment, and the facility; monitor hospitalised animals for early detection; and work to manage these risks as far as is practically possible from intake to discharge.

Risks associated with Sedation and Anaesthesia

Before agreeing to sedation and anaesthesia of your horse, it is important that you understand that the use of all sedative and anaesthetic drugs involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.

In order to safely perform surgical and diagnostic procedures on horses, it is usually necessary to immobilise them.

Immobilisation for veterinary treatment is achieved by a combination of sedation and local anaesthesia, or by general anaesthesia. Sedatives and anaesthetics are powerful



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drugs which act on a wide range of organ systems including the brain, heart, blood vessels, lungs and intestinal system to achieve their effect. The interactions of sedative and anaesthetic drugs with these organs and the other tissues of the body are complex and occasionally unpredictable. As a consequence, treatment with these drugs requires an assessment of the clinical status of the horse and can lead to unexpected reactions in individual horses.

Horses are complex animals and while it is not possible to detail all the potential complications associated with sedation and anaesthesia; the following is an outline of the major recognised areas of risk.

The risks and complications associated with equine sedation and anaesthesia are closely linked with the risks and complications involved in equine surgery. This information on Sedation and Anaesthesia Risks should be read in conjunction with the accompanying information on Surgery Risks.

Risks and Complications Related to Sedation

Sedation involves the administration of drugs which alter the level of consciousness of the horse and its ability to perceive the effects of surgical and other procedures. Sedation may be necessary to ensure animal welfare, pain relief and the safety of people and horses.

All sedative procedures of horses have the following potential complications: anaphylactic (“allergic”) reaction, collapse, excitement, iatrogenic injury. The consequences of a horse suffering one or more of these conditions can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved.



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Charles Sturt University veterinarians are aware of the risks and potential consequences of sedation and act to manage these risks as far as is practically possible. Occasionally and in spite of all precautions, horses suffer one or more of these complications when they undergo sedation. This most commonly occurs when the horse is already suffering from disease or injury, is very young, is an older animal or has an “excitable” temperament; however, it can also happen to horses which appear fit and healthy and show no signs of compromise prior to sedation. If prolonged or repeated sedation is necessary, this may further increase the risk of some complications.

- **Anaphylactic (Allergic) Reaction:** Horses can have an allergic reaction to any medication they receive. The extent of the reaction can range from mild skin wheals to collapse, inability to breathe and death (anaphylaxis).
- **Collapse:** Individual horses may be more sensitive than expected to the effects of sedative drugs and may stumble or fall when sedated. This can result in injury to the horse.
- **Excitement:** Sedative drugs can occasionally result in an excitement reaction in the horse. These reactions can range from mild muscle trembling to frenzied, uncontrollable activity and severe injury.
- **Iatrogenic Injury:** Any procedure involving horses, especially young, unhandled and fractious animals can result in accidental injury to the horse.
- **Reduced faecal output and colic:** May occur due to reduced gut motility associated with most sedatives. Pain, stress or repeated/very long periods of sedation may increase the risk of this complication. This may be mild and transient or prolonged which may lead to large intestine impaction and progress to rupture which is fatal.



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Risks and Complications Related to General Anaesthesia

General anaesthesia is a relatively high-risk procedure in the horse with world-wide studies showing a 0.6 % peri-operative fatality rate in non-colic horses undergoing anaesthesia. This rate is nearly ten times higher for horses undergoing emergency surgery such as colic. Due to the effects of the drugs and the size and temperament of the horse, all general anaesthesia procedures are accompanied by General Risks. Certain procedures and classes of horses are associated with increased levels of anaesthetic risk and potential complications. This information should be read in conjunction with the information related to the risks associated with surgery.

General Anaesthesia Risks

All anaesthesia procedures have the following potential complications: cardiac arrest, nerve injury, bone fractures, lameness, tissue damage, iatrogenic injury and colic. These complications can happen at induction of anaesthesia, during anaesthesia or during recovery from anaesthesia. However, studies from multiple veterinary hospitals have shown that life-threatening complications most often become apparent during recovery.

The consequences of a horse suffering one or more of these conditions can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved. Charles Sturt University veterinarians are aware of the risks and potential consequences of anaesthesia and act to manage these risks as far as is practically possible.

Occasionally and in spite of all precautions, horses suffer one or more of these complications when they undergo anaesthesia. This most commonly occurs when the horse is already suffering from disease or injury, is very young, is an older animal or has an "excitable" temperament; however, it can also happen to horses which appear fit and healthy and show no signs of compromise prior to anaesthesia.

- **Cardiac Arrest:** Anaesthetic drugs act by depressing the action of the heart and other organs, occasionally horses can be unexpectedly sensitive to the effects of



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the drugs and may suffer a cardiac arrest. Cardiac resuscitation is extremely difficult in the horse and cardiac arrest is usually fatal.

- **Tissue Damage:** tissues including skin, muscle, nerve and eyes can be injured during the anaesthetic procedure, including during the induction and recovery phases.
- **Myopathy / Neuropathy:** these complications can occur usually in large heavy muscled horses and are associated with muscle or nerve damage due to pressure and/or lack of blood flow. Areas that are dependant (on the underside of the recumbent horse) during anaesthesia are usually affected. The consequences of this complication will vary depending on the severity of tissue damage. Rarely, the horse is unable to stand during recovery, and this can be fatal. In most cases, these complications can be managed using appropriate positioning and padding of the patient during anaesthesia and ensuring blood pressure is medically supported.
- **Post anaesthetic colic:** may occur secondary to reduced gut motility associated with general anaesthetic and sedative drugs. This may be mild and transient or prolonged and can reduce faecal output which may lead to large intestine impaction and progress to rupture which is fatal.
- **Bone Fractures:** Due to their size and temperament, horses can break bones during an anaesthetic procedure. This most commonly occurs during recovery when a horse attempts to stand while it is uncoordinated and still suffering from the effects of the anaesthetic drugs. Fracture of a long bone/s of the leg of the horse or other major bones usually results in euthanasia.
- **Iatrogenic Injury:** Any procedure involving horses, especially young, unhandled and fractious animals can result in accidental injury to the horse.



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Anaesthesia risks associated with specific situations

While the general complications are a risk with any anaesthesia, they can be more likely and potentially more serious in certain classes of horses and when certain procedures are performed.

Age

Newborn foals have immature physiological systems which mean they are more susceptible to the adverse effects of the anaesthetic drugs and any illness they may be suffering from. Horses over the age of 14 years have an increased risk of complications associated with general anaesthesia and are more prone to the risk of long bone fracture in recovery.

Length of Anaesthesia

Horses that are anaesthetised for periods greater than two hours have an increased risk of anaesthetic complications, including muscle damage, long bone fracture and death. Risk is further increased with procedures over 3 hours duration.

Reproductive status

Pregnant and lactating mares have an increased risk of anaesthetic complications. This risk is often exacerbated as these horses most often need to be anaesthetised in emergency situations and when they are very ill.

Type of Surgery

Horses that are anaesthetised for emergency surgery, especially Caesarean section and colic surgery have a significantly increased risk of anaesthetic complications and death. Horses that are anaesthetised for the surgical repair of bone fractures have an increased risk of anaesthetic complications and death.



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Sick Horses

Horses with underlying illness have less effective organ function and are more susceptible to the adverse effects of the anaesthetic drugs so have an increased risk of anaesthetic complications.

General risks associated with Surgery

Before agreeing to a surgical procedure on your horse, it is important that you understand that surgery of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.

Horses are complex animals and while it is not possible to detail all the potential complications associated with surgery, the following is an outline of the major recognised areas of risk.

All surgical procedures have the following potential complications: haemorrhage, infection, pain, neurological problems and iatrogenic or inadvertent injury.

The consequences of a horse suffering one or more of these conditions can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved. Charles Sturt University Veterinarians are aware of the risks and potential consequences of surgery and act to manage these risks as far as is practically possible.

Occasionally and in spite of all precautions, horses suffer one or more of these general complications when they undergo surgery. This most commonly occurs when the horse is already suffering from disease or injury, is very young or is an older animal; however, it can also happen to horses which appear fit and healthy and show no signs of compromise prior to surgery.



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General surgical risks include:

Haemorrhage

Surgical procedures can result in bleeding or haemorrhage from the surgical site. This can range from minor bleeding of little consequence to severe haemorrhage that could potentially be life threatening. Circulatory blood volume is maintained during anaesthesia using intravenous fluid therapy and in some surgical cases where increased blood loss may be anticipated, blood transfusion may be performed during surgery. However, in an emergency situation, donor blood may not be available, and severe haemorrhage can be fatal despite intensive treatment.

Infection

Bacterial tissue infection can occur following surgical procedures. Risk of infection is significantly increased with tissue trauma, compromised patients, prolonged surgery times, and surgical implants such as orthopaedic plates and screws. If a procedure has a known high rate of infection, antibiotics will be administered prior to and after the procedure. Occasionally, and in spite of all precautions, infection can occur that can range from minor wound infection to systemic infection and life-threatening complications.

Pain

All surgical procedures are invasive and will stimulate a pain response in the patient. In order to safely perform surgical procedures on horses a combination of sedation and local anaesthesia or general anaesthesia is necessary. Sedative and anaesthetic drugs provide an analgesic or “painkilling” effect which varies depending on the individual horse and the drugs used.

Non-steroidal anti-inflammatory drugs (NSAIDs) such as phenylbutazone are also routinely administered prior to surgery to help reduce any pain response. Controlling pain is very important and significantly reduces the risk of complications during and in recovery from anaesthesia as well as minimizing stress for our equine patients and



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providing for their welfare. Other categories of pain medications such as opioids or sedatives are sometimes necessary. These medications are known to reduce gut motility which poses a risk of colic. See the associated information regarding risks associated with anti-inflammatory drugs.

Neurological Problems

Damage to the nervous system is a rare complication associated with surgery. Very rarely damage to the brain or spinal cord (central nervous system/CNS) may occur associated with spread of blood clots from a surgical site. Damage to the CNS may also occur if there is decreased blood supply due to severe haemorrhage, or due to decreased oxygenation of the blood. Acute blood loss can occasionally cause blindness that may be permanent and irreversible. Additionally, myopathy (muscle injury) or neuropathy (nerve injury) may occur occasionally as a complication of general anaesthesia. Risk of these conditions are higher in animals of heavier body weight. This can rarely result in a horse that is unable to stand in recovery and may lead to death.

Iatrogenic / inadvertent Injury

Accidental injury may occur in any procedure, and accidental tissue damage may occur during any surgical procedure. The consequences of this injury will depend on the tissue involved. A common example of inadvertent tissue injury is the latent thermal necrosis (tissue death) produced by laser-assisted surgery. After the laser is removed, some degree of delayed tissue death will occur in the days following the surgical procedure.

Risks associated with Specific Surgical Procedures

Before agreeing to a surgical procedure on your horse, it is important that you understand that surgery of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.



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Horses are complex animals and while it is not possible to detail all the potential complications associated with sedation and anaesthesia, the following is an outline of the major recognised areas of risk.

Charles Sturt University Veterinarians are aware of the risks and potential consequences of surgery and act to manage these risks as far as is practically possible.

While the general complications outlined above are risks with all types of surgery, they can be more likely, and potentially more serious when certain procedures are performed.

Orthopaedic Surgery (involving surgery of joints and bones)

Fracture Repair

Many fractures can be successfully repaired in the horse and enable return to full function. Surgery (“internal fixation”) may be necessary to facilitate fracture repair, and the prognosis will vary depending on the bone involved, presence of a wound, the type of fracture and other factors such as the size and temperament of the horse.

Complications associated with fracture repair include implant failure, infection, supporting limb laminitis and, as surgery time is often prolonged, there may be increased complications associated with anaesthesia.

Surgical implants (metal bone plates and bone screws) are necessary in many fracture repairs.

“Implant failure”, where the plates and screws bend or come loose, can occur in the recovery phase from anaesthesia or later following surgery. Implant failure is associated with excessive forces from weightbearing and incoordination and results in disruption of the fracture repair. In most cases, this is catastrophic and euthanasia of the horse is necessary.



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Risk of infection is also increased in fracture repair because of soft tissue trauma associated with the injury. Infection associated with plates and bone screws is often difficult to control without removal of implants and can lead to delayed or failure of fracture healing, with risk persisting in the months following the initial repair. If removal of implants is possible, this will require a second surgery usually under general anaesthesia. Severe bone infection (osteomyelitis) often results in euthanasia of the animal due to prolonged illness, cost, and guarded prognosis.

Fractures usually cause severe lameness in the affected leg. Successful surgical repair will usually improve the level of weight bearing on the affected leg however there is often overloading of the contralateral (opposite) leg which can lead to “supporting limb laminitis” or “founder” in the otherwise normal leg. This can be a major complication that can lead to euthanasia. It is most frequently seen in heavy adult horses and in front legs. Although foals do not generally develop laminitis, angular limb deformity of the supporting (normal) limb can occur if balanced weight-bearing is not achieved. This complication can result in the need for a second surgical intervention in attempt to correct the deformity.

Prolonged surgery time may be necessary to achieve satisfactory fixation of complex fractures in horses. Increased anaesthesia time is known to be associated with increased risk of complications in recovery.

Joint Surgery “Arthroscopy”

Arthroscopic surgery involves inserting a camera and instruments into a joint through small skin incisions. This technique allows good visual assessment of the internal structures of the joint with faster recovery and lower risk because of the small incisions and sterile flushing of the joint. Arthroscopic surgery is performed under general anaesthesia.

Complications associated with arthroscopic surgery are rare and in appropriate cases, this technique has become the standard method of joint surgery in horses. Joint



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infection following arthroscopic surgery is rare and has an incidence of 0.5-1.5%. Risks for infection include larger fragment size (often associated with OCDs in the hock), and draft breed. Infection most commonly develops at the time of suture removal, and it is imperative to have an experienced person, ideally a veterinarian, remove the sutures under clean conditions.

Other specific complications include tissue swelling and haemorrhage. However, these complications are generally minor and self-resolving. Rarely, a synovial hernia may occur at the site of instrument or arthroscope insertion that can lead to a soft swelling of the skin surface over the joint. Inadvertent damage to cartilage or other tissues adjacent to the joint may occur rarely. Instrument breakage is rare but may require extended or subsequent surgery to remove the broken fragment.

Post operative care of arthroscopic cases is important, and careful attention should be paid to discharge instructions, maintaining a clean stable environment and bandage changes to avoid post operative complications.

In some cases, arthroscopic surgery can involve multiple joints. Whilst this may reduce the costs associated with multiple surgeries, it will increase surgical and anaesthetic times which may increase the risks to the patient.

Transphyseal Bridge / Periosteal Strip surgery

Periosteal elevation surgery ("Strips") and transphyseal bridge surgery ("Bridges") are performed in foals to help correct angular limb deformities in foals with less-than-ideal conformation (commonly called "Bent legs"). Periosteal "strips" and transphyseal "bridges" are performed under general anaesthesia.

Complications associated with periosteal strips are rare but can include infection of the surgical site. Failure to correct the deformity may occur, or the deformity may continue to worsen as the foal matures.

Transphyseal bridge surgery may be recommended if the angular limb deformity is severe or if there has been insufficient correction following periosteal stripping. "Bridge"



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surgery involves the placement of orthopaedic implants across the “physis” or “growth plate” of the bone to limit bone growth on that side and allow straightening of the limb. Success of this surgery is dependent on bone growth and therefore the age of the foal when this surgery is performed is very important.

Generally, this procedure has a low complication rate and a high success rate. However, complications including local wound infection, and over- or under-correction may occur. Persistent local wound infection may lead to scarring and permanent white hairs at the surgery site. This is commonly associated with pressure applied from the bandage at the site of the screw head. Failure to remove the bridge at the appropriate time can result in “over-correction” of the angular deformity. It is therefore important that the foal is closely monitored for correction and is re-presented to the veterinary surgeon for bridge removal.

Bridge removal requires a second general anaesthetic and surgical procedure.

Failure to remove the bridge will mean that it will be visible on yearling sale radiographs.

Rarely, orthopaedic drill or screw breakage may occur. In most cases, the broken drill or screw can be removed but occasionally this is not possible. Whilst this is unlikely to be of clinical significance to the horse, the broken screw will remain visible on sales radiographs.

Inadvertent damage to a joint or fracture of the physis associated with bridging can occur but is extremely rare.

Post operative care is extremely important to reduce complications such as wound infection. In young foals with carpal valgus or “Knock knee” deformity, restriction of exercise can be very important to reduce the risk of serious complications such as carpal bone fracture of the knee.



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Soft Tissue Surgery

Colic

Abdominal pain in horses is commonly referred to as Colic. Colic ranges in severity from mild abdominal discomfort to severe, life-threatening, uncontrollable pain that requires surgical intervention. Colic surgery is a life-saving and most frequently emergency procedure which allows examination of the abdomen and intestine and permits correction of surgical problems.

Colic surgery is performed by a midline incision through the abdominal wall under general anaesthesia. Colic can cause serious changes to the normal function of many body systems, which can lead to cardiovascular compromise or shock. These changes will generally be worse if the duration of colic is prolonged. There is an increased risk of anaesthesia associated with such patients.

Complications are commonly encountered in colic patients because of the severity of the disease. Post operative complications can include persistent pain or colic, endotoxaemia that can lead to other complications including “endotoxic shock” and laminitis or “founder” (inflammation and destruction of the tissues of the feet), “peritonitis” (infection within the abdomen), “colitis” (inflammation of the large intestine), adhesion formation (internal scar tissue), infection of the surgery site which can lead to hernia or evisceration (release of the intestine through the wound), and infection or thrombosis of the blood vessels such as the jugular vein.

In some cases, these complications may be life threatening despite intensive care treatment.

Success of colic surgery will vary depending on the particular surgical problem identified, ease of surgical correction, the duration of colic and the occurrence and successful management of post-operative complications. Overall, colic surgery is associated with a success rate of approximately 70%. Prompt referral and surgical



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intervention can significantly reduce the risk of complications and improve the chances of success of colic surgery.

Castration

Castration involves surgical removal of the horse's testicles.

Castration can be performed in the standing horse under sedation and local anaesthesia or under general anaesthesia. The decision to perform castration standing or under general anaesthesia is made in consultation with the person who is physically in charge of the horse at the time of the surgery. Owners who require that the surgery is performed either standing or under general anaesthesia should make this requirement known to both the veterinary surgeon and the person in charge of the horse.

Whilst castration is a procedure very commonly performed on colts for management reasons; there are potentially serious complications associated with castration in horses. After castration the wound may be closed or left open to drain. Choice of technique is dependent on whether castration is performed on the standing or anaesthetized horse, age and type of the horse and preference of the veterinary surgeon and owner. Potential complications exist with both techniques and whether the procedure is performed on the standing or anaesthetized horse.

Castration sites that are left open to drain and heal require wound cleaning and hygiene and for the horse to be actively exercised for up to two weeks following surgery.

Primary closure of the castration site is performed under general anaesthesia and involves suturing the wound closed after removal of the testicles. Closure of the castration site is surgeon and case-dependent and requires a period of confinement in the weeks following the procedure.

Regardless of procedure type, potential complications associated with castration include swelling, haemorrhage (bleeding), infection and herniation or evisceration (release of internal tissue or intestine through the wound). These complications can be life threatening and emergency treatment may be necessary to save the horse.



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Standardbred and warmblood breeds are at a higher risk of herniation of the intestine at the site of castration. Minor complications such as swelling of the scrotum and sheath, or local infection are common and most often require little or no treatment.

Cryptorchid “Rig” Castration

Cryptorchidism is where one or both testes have failed to descend from the abdomen into the scrotum. Cryptorchid castration involves surgical exploration to remove the retained testes. Cryptorchid castration surgery can be performed with a traditional (inguinal) approach or via laparoscopy (minimally invasive procedure using a camera and instruments inside the abdomen). The traditional approach is performed under general anaesthesia, and a laparoscopic approach can be performed on the anesthetized or on the standing, sedated horse. Complications can include bleeding, swelling of the surgical site, infection and breakdown of the tissue at the surgical site which may lead to peritonitis (infection within the abdomen) or herniation of intestine. Laparoscopic procedures carry a higher risk of inadvertent tissue injury due to blind entry into the abdomen. However, this complication is rare. Laparoscopic approaches result in faster return to activity and lower risk for surgical site complications. Mild, self-limiting colic is common after laparoscopic procedures due to the use of gas sufflation (extension) of the abdominal cavity for visualization during surgery.

Laparoscopic Surgery

Laparoscopic surgery involves the insertion of a camera and surgical instruments through the abdominal wall. Laparoscopic surgery may be recommended for reproductive surgery such as removal of an abnormal ovary (“ovariectomy”), oviduct flushing or uteropexy in sub-fertile mares, or cryptorchid castration in colts. Laparoscopy also allows visualization of areas of the horse’s abdomen that are inaccessible by other surgical methods and may allow diagnosis and treatment without the need for more invasive abdominal surgery and general anaesthesia.



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Complications and post-operative recovery times associated with laparoscopic surgery are significantly reduced because of the small incisions that are used. However, potential complications include intra-abdominal haemorrhage (bleeding), peritonitis (infection of the abdominal cavity), inadvertent injury to intestine and instrument breakage or loss. Mild, self-limiting colic is common after laparoscopic procedures due to the use of gas sufflation (extension) of the abdominal cavity for visualization during surgery.

Caesarean

Caesarean section surgery to manage dystocia (foaling difficulty) in the horse is an emergency procedure that is used to deliver a live foal or a foal that has died and cannot be safely delivered through the vagina. Caesarean section surgery is performed through a large surgical incision in the mare's abdomen and uterus to remove the foal and is performed under general anaesthesia. Complications are commonly encountered due to the severity of the condition and its effects on the various tissues and organs of the mare. In addition to increased risk of anaesthesia in a foaling mare, surgical risks associated with caesarean section include haemorrhage (bleeding), peritonitis (infection within the abdomen), infection and tissue breakdown at the surgical site which can lead to hernia or evisceration (release of the intestine through the surgical site).

Retained placenta and foetal membranes occur commonly following caesarean section and are normally managed post operatively with uterine lavage (flushing) and other medical treatments but are associated with risk of infection, endotoxaemia and laminitis.

For a mare with a known high risk of foaling complications, it is recommended for the mare to be under 24-hour care as she approaches her expected foaling date, with a plan in place allowing for timely veterinary intervention.



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It is critical that elective Caesarean is performed at the optimal time. Intensive monitoring of the mare and foal are undertaken prior to elective Caesarean. The risks associated with an elective Caesarean are lower than for an emergency Caesarean, however this remains a major surgical procedure and there is the potential for similar complications to occur.

Terminal Caesarean section may be performed in an emergency situation to remove a live foal from a mare that is dying but is close to her expected foaling date. The procedure results in a dead mare and a foal which requires intensive care to survive.

Sinus Surgery

Sinus surgery may be necessary to treat problems such as ethmoid haematomas (benign growths of highly blood-filled tissue within the nasal cavity and sinus) or sinusitis (infection of the sinuses). These conditions are more frequently encountered in older horses.

Sinus surgery may be performed on the standing horse, under sedation and local anaesthesia, or under general anaesthesia. Potential risks associated with sinus surgery include blood loss, persistent infection, oro-maxillary fistula (a permanent hole between the oral cavity and the sinus) and neurological problems.

Removal of a “bone flap” to allow surgical access to the sinus, may also result in a poor cosmetic appearance. If the risk of blood loss is considered high, a transfusion of blood from a donor horse may be performed. Blood transfusion carries a risk of “transfusion reaction” which can be life-threatening.

Surgery of the Eye

Surgical treatment of the eye or adjacent structures is performed for a variety of conditions including injury and infection. Surgical treatment of eyes is often performed under general anaesthesia but some procedures such as the placement of subpalpebral lavage tubes (treatment tubes) may be performed on the standing horse using sedation and local anaesthesia.



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All surgical procedures of the eye, or close to the eye carry the risk of inadvertent injury to the structures and tissues of the eye and inflammation that could lead to loss of vision. An increased risk of “bradycardia” (slow heartbeat) and occasionally “cardiac arrest” have been associated with eye surgery due to stimulation of the vagus nerve.

Conjunctival pedicle grafts (“conj. or conjunctival Grafts”) are commonly used to help treat deep corneal ulcers. Risks associated with this procedure include breakdown or failure of the graft, ongoing infection that could lead to rupture of the globe (eyeball), and permanent scar formation leading to corneal opacity. Globe rupture can result in permanent blindness and removal of the eye may be necessary. Permanent corneal scarring may lead to a reduction in the field of vision; the significance of this will vary depending on the location on the cornea and the expected use of the horse.

Complications of ocular surgery may result in the need for enucleation (removal of the eye), which is a procedure carrying its own risks, of which, local infection is the most common and generally resolves with wound care and/or antimicrobial therapy.

Sub-palpebral lavage tubes (eye treatment tubes) are frequently used to aid medical treatment of the eye. These tubes are well tolerated by most horses but occasionally cause irritation and rubbing that may result in self-inflicted trauma to the eye.

Surgical Risk associated with Class of Horse

Before agreeing to a surgical procedure on your horse, it is important that you understand that surgery of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.

Charles Sturt University veterinarians are aware of the risks and potential consequences of surgery associated with the various classes of horse and act to manage these risks as far as is practically possible.



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Foals

Foals commonly undergo general anaesthesia and surgery to treat angular or flexural limb deformities (“bent legs”). Foals may also undergo general anaesthesia and surgery to treat injuries, infections, colic or ruptured bladder. In general, the specific risks associated with anaesthesia and surgeries of newborn foals are related to the immaturity of their physiological systems. Any condition which causes stress to a foal may predispose the foal to gastric ulceration. This may lead to perforation of the stomach or intestine and subsequent death. To minimise stress, foals are kept with the mare as much as possible in the induction of and recovery from anaesthesia.

Colic surgery in foals is a high-risk procedure, and foals are susceptible to all of the complications of colic. In particular, colic surgery in foals is associated with an increased risk of “adhesion formation” (internal scarring within the abdomen), which can lead to subsequent episodes of colic and possibly death. Foals with ruptured bladders are high risk patients. They are unable to excrete potassium from the body. High blood potassium can cause serious heart problems and death if not corrected. These cases are treated medically before surgical repair is performed under general anaesthesia however the effects of electrolyte imbalances make the foal more susceptible to the adverse effects of anaesthetic drugs.

Pregnant mares

Pregnant mares may undergo general anaesthesia and surgery for treatment of a variety of conditions including injury, infection, colic and foaling difficulties. General anaesthesia during pregnancy carries a risk of abortion. This risk is extremely low, especially in the first two thirds of pregnancy. When possible, elective surgery under general anaesthesia in heavily pregnant mares is avoided. There is no evidence that any of the anaesthetic drugs commonly used in horses cause foetal damage or loss. Anaesthesia in pregnant mares also carries increased risks associated with reduced heart function, blood flow and respiration. Pregnant mares have an increased risk of



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catastrophic limb fracture during recovery from anaesthesia. Limb fracture usually results in death of the mare.

Stallions

Stallions may undergo general anaesthesia and surgery for treatment of a variety of conditions including injury, infection and colic. Specific risks associated with surgery on stallions are related to temperament and size. Stallions may be at increased risk of myositis (muscle injury) or neuropathy (nerve injury) because of their increased muscle mass and weight. Temperament may lead to poor anaesthetic induction or recovery which can lead to injury.

Sperm production and fertility can be affected by any condition which causes a stress reaction in a stallion; these conditions can include pain, infection, high temperature, general anaesthesia and surgery.

Older Horses

Older horses may undergo general anaesthesia and surgery for treatment of a variety of conditions including injury, infection and colic. Ageing is associated with delayed wound healing, less effective organ function, diseases affecting metabolism, lameness, reduced joint flexion, osteoporosis ("weak bones") and muscle weakness. All of these factors are associated with increased risks for general anaesthesia and surgery.

Sick Horses

Horses which are suffering from underlying illness may need to undergo general anaesthesia and surgery for treatment of a variety of conditions including injury, infection and colic. There is an increased risk associated with anaesthesia and surgery of sick horses. The underlying illness may be associated with less effective organ function, including a lower ability to cope with the adverse effects of anaesthetic drugs and an increased susceptibility to infection. The underlying illness can result in severe and potentially life-threatening consequences.



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American Quarter Horse and Paint Horse Breeds

Prior to surgical intervention, American Quarter and Paint Horse breeds should have 5-panel genetic disease testing performed. Horses that are genetic carriers for malignant hyperthermia, PSSM-1, MYHM, and HYPP pose a higher anaesthetic risk. The status of your animal may change the anaesthetic and surgical approach.

Draft and Large Warmblood Breeds

These breeds are at risk for muscle and glycogen storage disease as seen in the Quarter Horse. In addition, their large body mass puts them at higher risk of myopathy, neuropathy, and airway obstruction.

General Risks associated with Antimicrobial (Antibiotic) Therapy

Before agreeing to any medical treatment of your horse, it is important that you understand that medical treatment of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.

Horses are complex animals and while it is not possible to detail all the potential complications associated with antibiotic therapy, the following is an outline of the recognised areas of risk.

Antibiotics are drugs that are used to treat infection. Different antibiotics have different mechanisms of action, but in general may cause complications such as diarrhoea, colic, muscle injury, abscess formation, thrombophlebitis, iatrogenic injury, allergic reactions and organ toxicity.



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The consequences of a horse suffering one or more of these conditions can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved. Any horse receiving this treatment can develop complications regardless of its health status. Charles Sturt University Veterinary Clinical Centre staff are aware of the risks and consequences of antibiotic therapy and act to manage these risks as far as is practically possible, including appropriate drug choice for each case and prescriptions that follow approved guidelines for route, frequency, and dose in horses.

Diarrhoea: This condition can range from mild signs requiring no treatment, apart from stopping the antibiotic treatment, through to severe diarrhoea which may require hospitalisation and intensive care and may be life-threatening. Adults are at greater risk than foals.

Colic: It can range from a self-limiting episode to requiring veterinary care, with or without occurrence of diarrhoea.

Muscle Injury: Pain or muscle injury at the injection site.

Abscess Formation: Abscess formation at the injection site. Abscesses may require lancing and further therapy.

Thrombophlebitis (infected vein): This condition can occur following catheter placement or a single intravenous injection. These infections range from mild, requiring no further treatment to more severe infections that result in the loss of the vein function.

Iatrogenic Injury: Any procedure involving horses, especially young, unhandled and temperamental animals can result in accidental injury to the horse, including to the eye which may result in damage and possible loss of the eye.

Organ toxicity: Some antibiotics are toxic to specific organs and cause reversible or permanent injury.



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Allergic reaction: Frequently expressed as hives, agitation, changes in respiratory rate, effort, or stridor production.

Risks associated with Specific Antimicrobial (Antibiotic) Classes

Before agreeing to any medical treatment of your horse, it is important that you understand that medical treatment of all animals involves some risk to the patient and that it is not possible to identify all of these risks prior to the procedure.

Charles Sturt University Veterinary Clinical Centre staff are aware of the risks and potential consequences of antibiotic therapy and act to manage these risks as far as is practically possible.

Horses are complex animals and while it is not possible to detail all the potential complications associated with antibiotic therapy, the following is an outline of the major recognised areas of risk.

Antibiotics are drugs that are commonly used to treat infection in horses.

It is important to use antibiotics as prescribed and follow instructions exactly, as many of the possible complications are associated with incorrect administration (dosage, frequency, or route).

Different drugs have different mechanisms of action but ultimately interfere with the normal intestinal flora (microbiome), and diarrhoea is a common treatment-related complication, regardless of the prescription or the animal's health status.

Dehydration can increase the risk of renal injury, and the veterinary staff might recommend a blood test or fluid therapy when using certain antibiotics.



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Penicillin (Benzyl penicillin and procaine penicillin)

Procaine is the agent that stabilises penicillin for intramuscular use. If procaine is accidentally injected into a blood vessel, it causes extreme central nervous system stimulation, including frantic and uncontrollable behaviour. This is not an allergic reaction, and it is self-limited. There is no treatment, although horses may have traumatic injury. Keeping procaine penicillin refrigerated, shaking well before drawing, and using the correct route and technique can prevent this occurrence.

Penicillin rarely results in autoimmune disorders such as haemolytic anaemia (destruction of red blood cells) and autoimmune thrombocytopenia (drug induced destruction of platelets). Clinical signs usually resolve once penicillin therapy has stopped, however severe signs may require supportive therapy, including hospitalisation, intravenous fluid therapy or a blood transfusion.

Anaphylaxis/allergic reactions occur following previous exposure/sensitisation to penicillin. Mild signs include skin wheals, lumps, and generalised swellings, while more severe reactions may cause the horse to drop suddenly to the ground, showing breathing difficulties. This is often fatal and is very rare in horses.

Aminoglycosides (Gentamicin and Amikacin)

Increased risk of kidney injury (nephrotoxicity) is associated with length of therapy (greater than 7- 10 days), dehydration, treatment with other drugs that affect kidney function, existing renal disease and frequent doses. Clinical signs may initially be vague, including failure to thrive, weight loss, or abnormal blood results. Mild cases may return to normal with time and minimal therapy. Severe cases may result in kidney failure and potentially the death of the horse. These risks are reduced by ensuring correct frequency, monitoring hydration and blood tests to monitor drug levels and kidney function. This class also has ototoxic effects, and reversible hearing loss has been reported.



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Chloramphenicol

Reversible anaemia and low white blood cell count due to bone marrow suppression is reported when therapy is longer than 2 weeks.

Human public health risk: 1 in 24,000-40,000 people develop a fatal idiosyncratic (specific to individual person, not possible to predict) aplastic anaemia. This can occur if the drug is ingested or touches the skin of sensitive people, so it is essential to use safety precautions (gloves and mask) whenever handling the drug.

Additional recommendations include avoiding vaccination in horses recently treated with chloramphenicol, as it may cause vaccination failure by suppressing antibodies.

Trimethoprim / Sulphonamides (TMPS)

Anaphylaxis/allergic reactions occasionally occur following previous exposure/sensitisation to trimethoprim/sulphonamide drugs. Mild signs include skin wheals, lumps, and generalised swelling, while more severe reactions may cause the horse to drop suddenly to the ground, showing breathing difficulties. This is often fatal. If the horse survives an allergic reaction, trimethoprim should not be given again as the next dose may be fatal.

Concurrent use with detomidine sedation may affect the heart causing arrhythmias and low blood pressure that can be fatal.

TMPS rarely results in autoimmune disorders such as haemolytic anaemia (destruction of red blood cells) and autoimmune thrombocytopenia (drug induced destruction of platelets). Signs usually resolve once TMPS therapy has stopped, however severe signs may require supportive therapy, including hospitalisation, intravenous fluid therapy or a blood transfusion.

Tetracyclines (Oxytetracycline, Doxycycline)

Increased risk of kidney injury (nephrotoxicity) is associated with length of therapy, dehydration, treatment with other drugs that affect kidney function, existing renal



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disease and high doses. The signs may initially be vague including failure to thrive, weight loss or abnormal blood results. Mild cases may return to normal with time and minimal therapy. Severe cases may result in kidney failure and potentially the death of the horse. These risks are reduced by ensuring correct dosing, monitoring hydration and blood tests to monitor drug levels and kidney function.

These drugs may result in collapse and death if given rapidly intravenously. This risk can be reduced by diluting the drug with sterile saline and slow intravenous administration. Flexor tendon relaxation may occur. This will reverse with time after finishing treatment with the antibiotic.

Teeth may become discoloured, especially in younger animals, this may be permanent.

Macrolides (Erythromycin, Azithromycin and Clarithromycin)

Foals treated with macrolides can develop hyperthermia, particularly in hot weather, and in extreme cases this can be fatal. Foals should be housed in the shade or boxed during hot periods and their temperatures monitored at least twice daily. If a foal shows respiratory distress or has a temperature above 39.5°C, alcohol baths/cold hosing and ventilation may be urgently required. Air-conditioned boxes can assist in managing foals on macrolide treatment. Hyperthermia can still occur up to 3 days after therapy has ceased.

Acute respiratory distress syndrome: signs are dramatic and appear similar to hyperthermia; however, clinical signs don't improve with cold hosing, anti-inflammatories or alcohol baths and may require hospitalisation and intensive care. Many cases are fatal.

Acute, potentially fatal diarrhoea in adults has been reported in mares when their foals are treated with these drugs for *Rhodococcus equi* infection (rattles). This risk can be minimised by wiping any residue from the foal's muzzle after treatment and separating the water source for mare and foal.



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Rifampin

This antibiotic is only used in combination with another antibiotic such as Clarithromycin or Trimethoprim/sulphonamide because of a high likelihood of antibiotic resistance developing.

Red staining of urine, tears, sweat and saliva is occasionally noted. This will reverse at the end of treatment.

Fluroquinolones (Enrofloxacin)

Arthropathies (joint disease) in foals causing joint effusion, pain, and cartilage defects have been reported. Horses should be confined during treatment to minimise potential damage to joints.

Transient neurological signs including excitability and seizures following rapid intravenous dosing. These signs are avoided by administering the drug via a slow intravenous injection.

Cardiac and central nervous system toxicity have been reported in horses treated with these drugs.

Metronidazole

Reduced appetite may occur and may be reduced by wiping or hosing out any residue in the horse's mouth after the treatment has been swallowed.

General risks associated with Anti-inflammatory Drug Therapy

Before agreeing to anti-inflammatory treatment for your horse, it is important that you understand that the use of all anti-inflammatory drugs involves some risk to the patient and that it is not possible to identify all of these risks prior to the treatment.



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Charles Sturt University Veterinary Clinical Centre staff are aware of the risks and potential consequences of anti-inflammatory therapy and act to manage these risks as far as is practically possible.

Horses are complex animals and while it is not possible to detail all the potential complications associated with anti-inflammatory therapy, the following is an outline of the major recognised areas of risk.

Anti-inflammatories are drugs commonly used to treat signs of inflammation such as pain, swelling, and fever.

It is important to use anti-inflammatory drugs as prescribed and follow instructions exactly.

There are three major classes of anti-inflammatory drugs: corticosteroids, non-steroidal anti-inflammatory drugs (NSAIDs) and polysulfated glycosaminoglycans (PsGag's). The use of drugs from any of these classes may result in the following complications: pain; muscle injury; abscess formation; joint infection and/or inflammation; thrombophlebitis; iatrogenic injury. The consequences of a horse suffering one or more of these conditions can range from minor to fatal, depending on the degree to which the horse is affected and the organ system involved.

- Muscle Injury: Pain or muscle injury at the injection site.
- Abscess formation at the injection site. Abscesses may require lancing and further therapy.
- Joint infection and/or inflammation: any drug administered into the joint can lead to infection or inflammation. Infected or inflamed joints result in lameness and swelling of the joint and are a serious and potentially fatal condition. Early recognition and aggressive treatment of the infection are vital to the horse's chance of a successful outcome. Occasionally, despite early and aggressive treatment, the infection is unable to be controlled, and the lameness is so severe that the horse has to be euthanised.



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- Thrombophlebitis (infected vein): This condition can occur following catheter placement or a single intravenous injection. These infections range from mild, requiring no further treatment to more severe infections that result in the loss of the vein and significant scarring.
- Iatrogenic Injury: Any procedure involving horses, especially young, unhandled and temperamental animals can result in accidental injury to the horse, including the eye which may result in damage to, and possible loss of the eye.

Risks associated with specific Anti-inflammatory Drug Classes

Before agreeing to anti-inflammatory treatment for your horse, it is important that you understand that the use of all anti-inflammatory drugs involves some risk to the patient and that it is not possible to identify all of these risks prior to the treatment.

Charles Sturt University veterinarians are aware of the risks and potential consequences of anti-inflammatory therapy and act to manage these risks as far as is practically possible.

Horses are complex animals and while it is not possible to detail all the potential complications associated with anti-inflammatory therapy, the following is an outline of the major recognised areas of risk.

Anti-inflammatories are drugs that are commonly used to treat the signs of inflammation such as pain and swelling in horses.

It is important that anti-inflammatory drugs are used in the manner in which they are prescribed and that specific instructions are exactly followed. Different anti-inflammatory drugs have specific complications related to their mode of action and their interaction with the horse.



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Corticosteroids

Immune function suppression can occur depending on the length of therapy, route, dose, or type of corticosteroid. When it happens, it allows infectious agents to multiply unchecked and cause more severe disease requiring aggressive treatment and intensive care and can result in prolonged illness and occasionally death. Joint infection can occur after intra-articular (into a joint) corticosteroid injection. Infected joints result in lameness and swelling of the joint and are a serious and potentially fatal condition. Similarly, topical corticosteroid use can increase the risk of a corneal ulcer becoming infected. Early recognition and aggressive treatment of the infection are vital to the horse's chance of a successful outcome. Inhaled corticosteroid therapy is not associated with pneumonia development.

Laminitis is a condition in which the soft and connective tissues of the horse's feet become inflamed and damaged. These tissue changes are permanent and result in lifelong foot issues which require therapeutic farriery management. The signs of laminitis can vary from mild lameness to severe non-weight-bearing lameness requiring euthanasia. Corticosteroid therapy has been linked to exacerbating insulin dysregulation in predisposed horses.

Abortion/premature foaling may occur when corticosteroids are given in the late stages of pregnancy. Corticosteroid therapy in pregnant mares is usually initiated in cases of severe disease. In these cases, the severity of the illness and the progression of the disease are often responsible for the abortion. Retarded growth can occur in foals suckling from mares treated with prolonged courses of corticosteroids. This condition occurs as a result of the drug being passed from the mother to the foal via the milk.

Increased appetite, drinking and urinating may occur as a result of treatment with high doses of corticosteroids.



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Non-steroidal Anti-inflammatory Drugs (NSAID's)

Right dorsal colitis is an inflammatory condition of part of the colon which can be caused by NSAID therapy. Horses may show signs ranging from lethargy, weight loss and intermittent colic, swollen lower limbs or sudden, severe diarrhoea. Depending on the severity of the signs, horses may require aggressive intensive care and may die from the condition. Horses affected by this condition may be susceptible to further bouts if treated again with NSAID therapy.

Stomach ulcers may occur following NSAID therapy. Horses may show a reduced appetite, discomfort when or after eating, failure to thrive, diarrhoea and, in foals, sudden death can occur due to perforation of the stomach wall. Ulcers may also occur in the mouth, oesophagus and caecum.

Another complication is kidney injury (nephrotoxicity) in dehydrated horses or with higher-dose therapy. The signs may initially be vague including failure to thrive, weight loss or abnormal blood results. Mild cases may return to normal with time and minimal therapy. Severe cases may result in kidney failure and the death of the horse

Rare complications include inhibition of platelet activation and bone marrow suppression. Inhibition of platelets can result in spontaneous or excessive bleeding following injury and low production of blood cells may result in anaemia or poor immunity. Severe cases may require intensive care and blood transfusion.

- **Flunixin**

Clostridial myositis is an infection of muscle at the site of the injection. This is a potentially fatal condition and flunixin is particularly associated with this effect. Signs include lethargy, fever, heat, pain and swelling at the site of the injection. Early recognition and aggressive treatment are vital to the horse's chance of survival. Occasionally, in spite of early and aggressive treatment, the infection is unable to be controlled, and the condition is so severe that the horse has to be subjected to euthanasia.



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- **Aspirin**

The platelet activation may be inhibited by NSAID therapy. Platelets are blood components involved in the clotting process. Inhibition of platelet action can result in spontaneous or excessive bleeding following injury. Aspirin is particularly associated with this effect.

- **Phenylbutazone**

Phenylbutazone has a narrow safety margin for the NSAID risks, especially in foals, ponies and dehydrated horses. The intravenous form of phenylbutazone is irritating to tissue if accidentally injected outside the vein. Signs include heat, pain and swelling at the site of injection and can be mild or so severe as to require aggressive surgical treatment and result in loss of the vein and significant scarring.

Polysulphated Glycosaminoglycans (PsGag's)

This class of drugs has anti-inflammatory properties because it acts indirectly in the inflammatory process and is commonly used to treat osteoarthritis and other joint diseases.

- **Pentosan polysulphate**

Pentosan can decrease the ability of blood to clot, which can result in excessive bleeding following injury. Severe cases of blood loss may require a blood transfusion. This complication is less likely when given as an intra-articular injection.

- **Adequan**

This drug is often given as an intra-articular injection. Joint infection or inflammation can occur following injection of PsGag's into a joint. Infected joints result in lameness and swelling of the joint and are a serious and potentially fatal condition. Early recognition and aggressive treatment of the infection are vital to the horse's chance of a successful outcome. Occasionally, despite early and aggressive treatment, the



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infection is unable to be controlled, and the lameness is so severe that the horse has to be subjected to euthanasia.

Other Agents

Hyaluronic Acid

Haemarthrosis (bleeding into a joint) may occur following injection of hyaluronic acid into a joint. Horses show signs of mild to severe lameness and may require intensive care and surgical flushing of the joint. Immune-mediated flares may occur after injecting hyaluronic acid into a joint. They are an inflammatory reaction to a foreign substance within the joint. Horses may show moderate to severe lameness and may require intensive care and surgical flushing of the joint.

Rectal Palpation / Per-Rectum Examination

Before consenting to rectal palpation of your horse, it is important that you understand that the procedure carries a risk of rectal tear, which can have serious consequences and may be fatal.

Rectal palpation is an important and commonly performed procedure in equine veterinary practice. It is most often used for reproductive management in conjunction with ultrasonography, but is also an important diagnostic tool for other conditions, such as colic.

Charles Sturt University veterinarians recognise the risks and potential consequences associated with rectal palpation and take all reasonable steps to minimise these risks. While not all potential complications can be outlined, the following summarises the most common associated risk:



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Rectal tear

Horses can be unpredictable in their behaviour, and because of their temperament and anatomy, all rectal palpations carry a recognised risk of rectal tear. A rectal tear involves damage to one or more layers of the rectal wall, ranging from superficial injury to a tear extending through all tissue layers. The consequences vary depending on the extent of the injury and can range from minor tissue disruption to serious illness requiring intensive medical treatment and major surgery, and in severe cases, death of the horse.

Occasionally and in spite of all precautions, horses can suffer a rectal tear while undergoing rectal palpation. It can happen to any horse undergoing the procedure.

In many cases, the veterinarian may feel the tear occur during palpation or observe fresh blood on the glove at the completion of the procedure. However, a rectal tear may also occur without the veterinarian being aware of it. When a tear is recognised, immediate steps will be taken to assess its extent, establish an appropriate diagnosis, and initiate treatment.

If a rectal tear is not recognised at the time of injury, there may be a delay before the horse develops clinical signs that alert the owner, horse staff, or veterinarian to the injury. This delay can postpone diagnosis, assessment of the extent of the tear, and initiation of appropriate treatment. Unfortunately, rectal tears can have severe consequences, and despite intensive medical and surgical management, some horses with partial-thickness tears and most with full-thickness tears do not survive.

Twins

Twin pregnancy in mares ranges from approximately 3–30%, depending on breed and breeding technique. For Standardbred mares in Australia, a commonly accepted rate is approximately 5-10% per reproductive cycle.



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Mares carrying twins are at increased risk of abortion during mid- to late gestation, and if the pregnancy continues to term, significant reproductive and foaling complications. Even when twins are delivered without incident, the mare remains at increased risk of retained foetal membranes and reduced fertility in the following breeding season. Twin foals are typically smaller and weaker than singleton foals, with greater susceptibility to disease and slower growth and development.

Given the significant risks to the mare and foals, standard equine reproductive management involves identifying twin pregnancies by ultrasonography and recommending reduction of one embryo. This is most commonly performed at 14–16 days of gestation, while the embryos are still mobile. If twins are identified at later stages, the veterinarian will discuss further options for pregnancy management. Embryo reduction has a high success rate, although there is a small risk of losing both embryos.

Some veterinary research indicates that manual twin reduction at 14–16 days of gestation may be associated with a lower live foaling rate in older mares (15+ years). However, given the significant risks associated with twin pregnancy, the benefits of reduction generally outweigh the potential disadvantages. Charles Sturt University veterinarians recognise these procedural risks and take appropriate measures to minimise them wherever practicable.

For several reasons, including ovulations occurring more than one day apart, embryo mobility, uterine cysts, and limitations in facilities or technology, twin or multiple pregnancies may not always be detected. Charles Sturt University veterinarians recognise that twin pregnancies can occur following any breeding and take all reasonable steps to thoroughly examine the mare's reproductive tract for evidence of twins at each pregnancy examination.

Although the risk of an undetected twin or multiple pregnancies is small and decreases with repeated reproductive examinations, individual variation in equine anatomy and physiology means that twins cannot be ruled out with absolute certainty. Therefore, it is not possible to guarantee that a mare is not carrying twins.